



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,850	10/22/2003	Ari Hottinen	60091.00238	4223
32294 7590 04/24/2008 SQUIRE, SANDERS & DEMPSEY L.L.P. 8000 TOWERS CRESCENT DRIVE 14TH FLOOR VIENNA, VA 22182-2700			EXAMINER KIM, KEVIN	
			ART UNIT 2611	PAPER NUMBER
			MAIL DATE 04/24/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/689,850	Applicant(s) HOTTINEN, ARI	
	Examiner Kevin Y. Kim	Art Unit 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-19,21-34 and 36-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-19,21-34,36-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-4,6-19,21-34,36-49 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-4,6-19,21-34,36-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ketchum et al (US 2003/0048856, previously cited) in view of Kuchi (US 2002/0126648).

Claim 1:

As shown in figures 3 and 4, Ketchum discloses a method of controlling communication resources of a telecommunications system, the method including: determining a performance measure characterizing performance of a communication channel (channel state information, page 2, paragraph [0026]) between a first transceiver and a second transceiver, the communication channel including modulation (see block 322a and 354a in figure 3), wherein modulation symbols are distributed using at least two radiation patterns (see different paths with different antennas (i.e. 324a, 324t in figures 3 and 4)), the performance measure being sensitive to the modulation (page 15, paragraph [0171]); and controlling the communication resources based on the performance measure (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs [0172] and [0173]). Ketchum does not specifically describe that the communication channel may use non-orthogonal modulation matrix. Kuchi teaches that

a communication channel using a non-orthogonal modulation matrix in order to increase the symbol rate in the same field endeavor of multiple input multiple output communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention was made to use a non-orthogonal modulation matrix modulating the MIMO communication channel of Ketchum for the purpose of increasing the symbol rate as taught by Kuchi.

Claims 16 and 46:

As shown in figures 3 and 4, Ketchum discloses an arrangement for controlling communication resources of a telecommunications system, the arrangement including: means for determining a performance measure characterizing performance of a communication channel (channel state information, page 2, paragraph [0026]) between a first transceiver and a second transceiver, the communication channel including modulation (see block 322a and 354a in figure 3), wherein modulation symbols are distributed using at least two radiation patterns (see different paths with different antennas (i.e. 324a, 324t in figures 3 and 4)), the performance measure being sensitive to the modulation (page 15, paragraph [0171]); and means for controlling the communication resources based on the performance measure (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs [0172] and [0173]). Ketchum does not specifically describe that the communication channel may use non-orthogonal modulation matrix. Kuchi teaches that a communication channel using a

non-orthogonal modulation matrix in order to increase the symbol rate in the same field endeavor of multiple input multiple output communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention was made to use a non-orthogonal modulation matrix modulating the MIMO communication channel of Ketchum for the purpose of increasing the symbol rate as taught by Kuchi.

Claims 31,50 and 51:

As shown in figures 3 and 4, Ketchum discloses a controller of a telecommunications system, the controller including:

a performance measure estimator for determining a performance measure that characterizes performance of a communication channel (channel state information, page 2, paragraph [0026]) between a first transceiver and a second transceiver, the communication channel including: modulation (see block 322a and 354a in figure 3), wherein modulation symbols are distributed using at least two radiation patterns (see different paths with different antennas (i.e. 324a, 324t in figures 3 and 4)), and wherein the performance measure is sensitive to the modulation (page 15, paragraph [0171]); and

a control unit connected to the performance measurement unit, the control unit for controlling the communication resources based on the performance measure (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs

[0172] and [0173]). Ketchum does not specifically describe that the communication channel may use non-orthogonal modulation matrix. Kuchi teaches that a communication channel using a non-orthogonal modulation matrix in order to increase the symbol rate in the same field endeavor of multiple input multiple output communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention was made to use a non-orthogonal modulation matrix modulating the MIMO communication channel of Ketchum for the purpose of increasing the symbol rate as taught by Kuchi.

Claims 2, 17, 32:

Ketchum further discloses determining a plurality of performance measures for a plurality of communication channels between the first transceiver and the second transceiver (page 2, paragraph [0026]); and controlling the communication resources based on the performance measures (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs [0172] and [0173]).

Claims 4, 19, 34:

Ketchum further discloses including determining the performance measure by using a channel model which characterizes the communication channel between the first transceiver and the second transceiver (page 2, paragraph [0026]).

Claims 6, 21, 36 :

Ketchum further teaches the modulation matrix includes at least one symbol which is transmitted Using at least two antenna resources within at least two symbol time intervals (see figures 3 and 4, page 12, paragraph [0136]).

Claims 7, 22, 37:

Ketchum further discloses the modulation matrix includes at least one element in a group including: one row for forming a vector modulation, a plurality of rows for forming matrix modulation, a symbol rate greater than one, a row having a dimension greater than that of a channel matrix, a column having a dimension greater than that of the channel matrix, effect of spreading, effect of carrier, effect of waveform, and effect of channelization codes (page 9, paragraph [0107]).

Claims 8, 23, 38:

Ketchum further discloses including determining the performance measure using at least one element in a group including: channel information on a radio channel associated with the communication channel, antenna weights associated with the communication channel, and modulation information on the communication channel (channel state information, page 2, paragraph [0026]).

Claims 9, 24, 39:

Ketchum further discloses the performance measure comprises at least one element selected from a group including: frame-error rate, bit-error rate, signal-to-noise ratio, signal-to-interference ratio (page 2, paragraph [0025]).

Claims 10, 25, 40:

Ketchum further discloses comprising selecting a transmission method based on the performance measure (page 15, paragraph [0173]).

Claims 11, 26, 41:

Ketchum further discloses controlling the communication resources is based on comparison between a target value and the performance measure (page 15, paragraph [0173]).

Claims 12, 27, 42:

Ketchum further includes adapting the communication resources to instantaneous requirements based on the performance measure (page 3, paragraph [0028]).

Claims 13, 28, 43:

Ketchum further teaches the communication channel further includes at least one element in a group including: interleaving, spreading, carrier waveform, sub-carrier waveform, channel encoding, matrix modulation, vector modulation, MIMO modulation, space-time coding, space-frequency coding, space-code coding, beam forming, multi-

Art Unit: 2611

beam forming, radio channel, channel decoding, detection, equalizing, RAKE reception, and filtering of a received signal (see figures 4A and 4B).

Claims 14, 29, 44:

Ketchum further teaches the communication resources include a transmit communication resource selected from a group including: a temporal transmit communication resource, a spectral transmit communication resource, an encoding resource, a spatial transmit communication resource, and transmit power (see encoding resource 412 in figures 4A and 4B).

Claims 15, 30, 45:

Ketchum further teaches the communication resources include receive communication resources (see figure 3).

Claims 47-49.

See paragraph [0173] in particular for using a receive filter matrix which depends on a non-orthogonal matrix via the extended channel mode.

4. Claims 3, 18, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ketchum et al. (US 2003/0048856) in view of Kuchi (US 2002/0126648) as applied to claims 1, 16 and 31 above, and further in view of Cheng et al. (US 6,411,817 cited previously).

Ketchum discloses all of the subject matters in claims 1, 16, and 31 above except for determining a second performance measure for a second communication channel between the

Art Unit: 2611

first transceiver and a third transceiver; and controlling the communication resources based on the determined performance measures.

Cheng et al. teach measuring a second communication channel between first transceiver and a third transceiver; and controlling the communication resources based on the determined performance measures (figure 1). It is desirable to include measuring a second communication channel between the first transceiver and a third transceiver in order to reduce interference and increase wireless system capacity. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include measuring a second communication channel between the first transceiver and a third transceiver as taught by Cheng into the system as taught by Ketchum so as to reduce interference and increase wireless system capacity. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin Y Kim/

Primary Examiner, Art Unit 2611